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6/18/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :

Thomas NOSKER et al.

Group Art Unit 3617

Serial No.: 09/985,937

Examiner: M. T. Le

Filed: November 6, 2001

For: ENGINEERED RAILROAD TIES

**DECLARATION UNDER 37 C.F.R. §1.132**

Assistant Commissioner for Patents
Washington, D. C. 20231



Sir:

I, Thomas J. Nosker, duly warned, declare and say as follows:

THAT, I am a United States citizen; that I graduated from Georgia Institute of Technology in 1980 with a B.S. degree in Mechanical Engineering; that I graduated from Rutgers University in 1983 with an M.S. degree in Mechanics and Materials Science; and that I received a Ph. D. from the Department of Mechanics and Materials Science, Specialty in Polymer Physics, from Rutgers University in 1988.

Considered
6/11/03

THAT, I am presently the president of the Plastics and Composites Group, Inc., a consulting, research and development, and materials testing service company serving the plastics, plastics recycling, pharmaceutical, and packaging industries.

THAT, I am an investor in Polywood, Inc., and a co-inventor of the above-identified patent application. A copy of my resume is attached.

I declare further:

THAT, I have personally observed, during installation and removal, the fracture of plastic based railroad ties having rectangular patterns other than the pattern recited (see attached) in

the claims of the above-identified patent application. These fractures occurred without any loads being imposed on the ties other than that imposed by the ballast, and the installing equipment. Conversely, tens of thousands of ties manufactured by Polywood, Inc. having the pattern recited in the claims of the above-identified patent application, and to my knowledge none of these ties have fractured in the same manner as the previously mentioned ties with other patterns.

THAT, attached is a data sheet from the Transportation Technology Center, Inc. (TTCI, Pueblo, CO), which show that the single tie push test force is about 2,800 pounds for a tie having a pattern in accordance with the claims of the above-identified patent application, but only on the bottom surface. On the other hand, for ties with the pattern on both the bottom and the sides, the single tie push test force is about 3,200 pounds. This can be compared with wood ties in which the single tie push test force is about 2,000 pounds and with concrete ties in which the single tie push test force is about 3,000 pounds. Thus, despite the fact that concrete ties typically weigh about three times as much as plastic ties, plastic ties with the claimed pattern on only the bottom exhibit a single tie push test force is only slightly less than that of concrete ties, and plastic ties with the claimed pattern on the bottom and the sides exhibit a single tie push test force which is greater than that of concrete ties. Concrete ties also contain steel rebar for purposes of reducing the occurrence of tensile fracture during installation and use. The ties of the invention do not require such reinforcement measures due to the design of the pattern.

To my knowledge, two other manufacturers of plastic railroad ties have achieved similar results with respect to single tie push test force. These ties, however, have sharp right interior angles as part of their patterns (checkerboard patterns of rectangular protrusions) which increases interior stress within the ties, and is commonly known as stress raisers. These ties use fiberglass reinforcement, like the steel rebar used in concrete ties, to reduce the incidence of tensile fracture.

The undersigned declares further that all statements are made herein of his own knowledge are true an that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001, Title 18, of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 5-29-03

Thomas J. Nosker

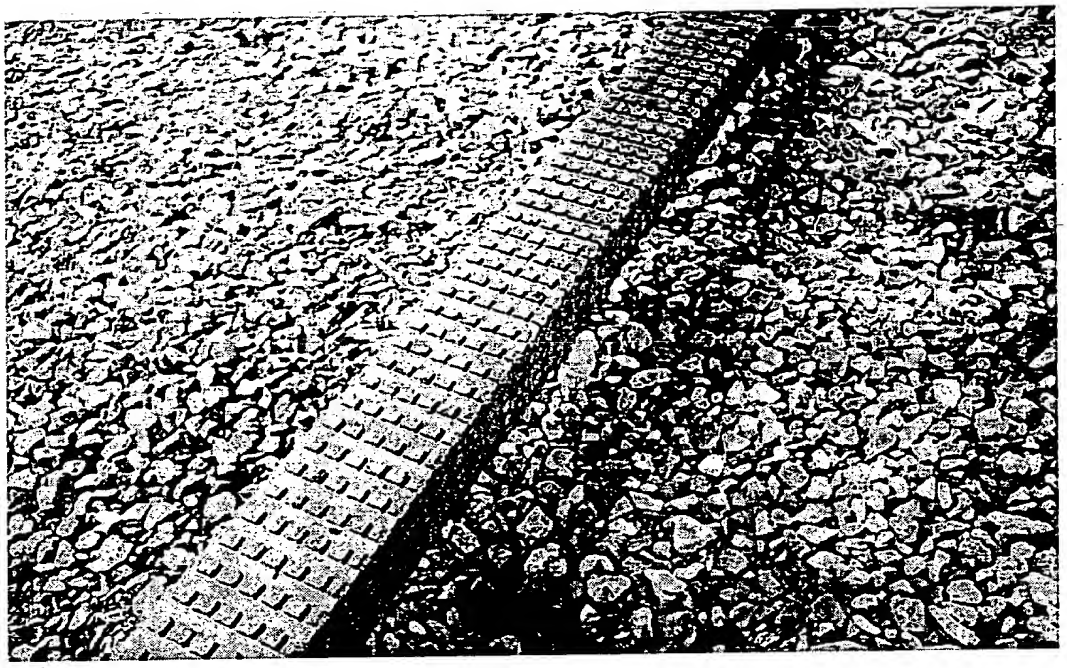

Figure 1. Plastic tie with surface pattern

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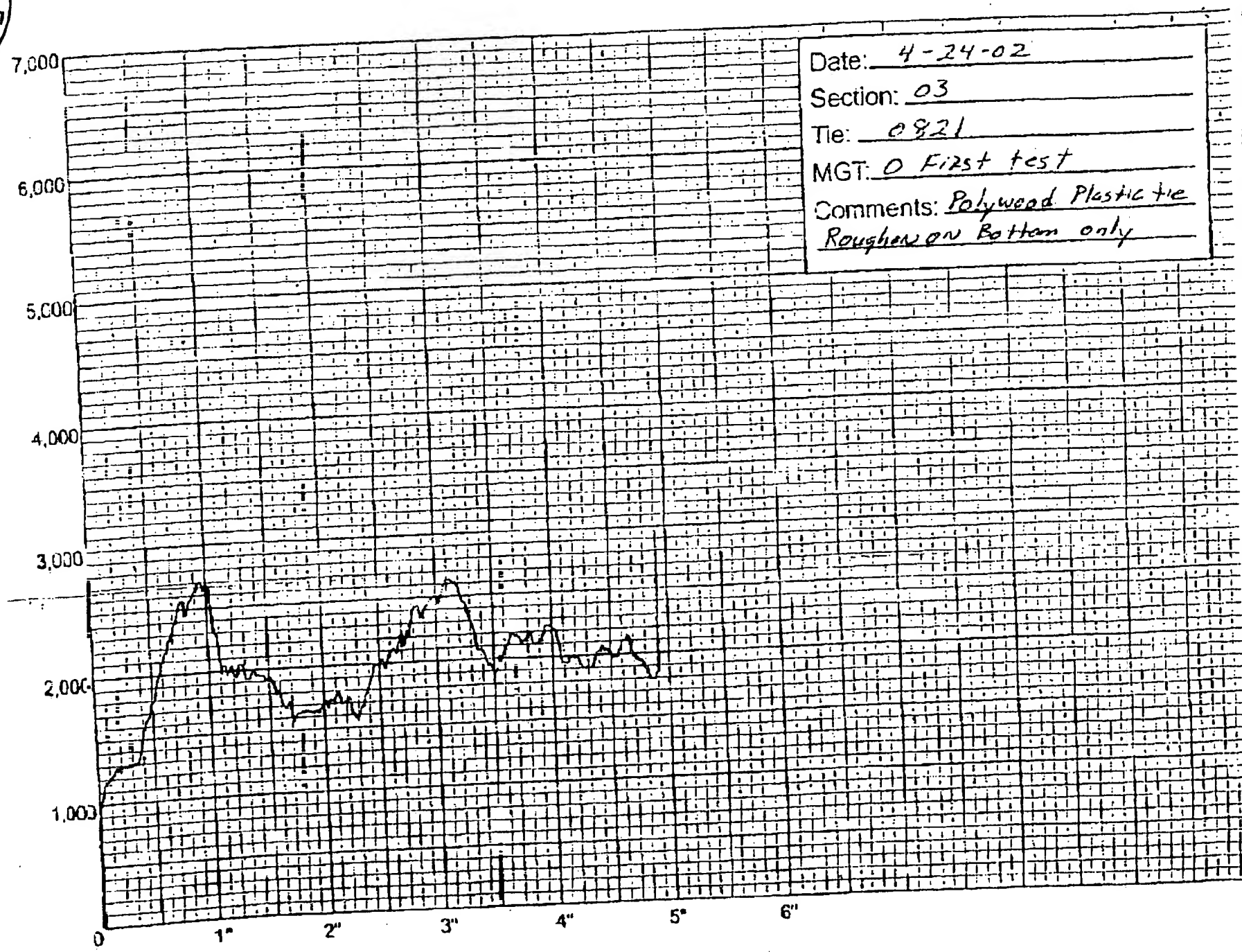

# THOMAS JEROME NOSKER

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**PROFESSIONAL EXPERIENCE**

**President,** (1990 - present) The Plastics and Composites Group, Inc. A consulting, research and development, and materials testing service company serving the plastics, plastics recycling, pharmaceutical, and packaging industries.

**Director**: October 1 1996 - February 1998, Rutgers University Plastics and Composites Group, Department of Civil Engineering. Directs a research effort aimed at developing technologies which place plastics and composites in the Civil Engineering Infrastructure. Also develops technologies to recycle and reuse plastics.

**Assistant Research Professor**: March 1988 - Present, Rutgers University Center For Plastics Recycling Research (closed Sept. 1996) and Center For Packaging Engineering. **Project Manager** for Commingled Plastics Research Projects, with full responsibility for all research activities and management of projects. Also faculty member, Center for Packaging Science & Engineering. Developed a two semester series of courses entitled "Packaging Materials and Mechanical Properties", a course entitled "Packaging, Recycling and the Environment", and a course entitled "Electronics Packaging".

**EDUCATION**

Ph.D., Department of Mechanics and Materials Science, Specialty in Polymer Physics, Rutgers University, Piscataway, New Jersey, January, 1988

M.S. Mechanics and Materials Science, Rutgers University, October, 1983.

B.S. Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia, March, 1980.

**AREAS OF SPECIALIZATION**

Polymer Physics, Electrical Properties, Metallurgy Mechanical Properties Heat Transfer, Classical Thermodynamics Polymer Kinetics, Solid Mechanics, Vector Analysis, Continuum Mechanics

**DISSERTATION**

"Rate-Dependence of the Glass Transition Pressure on Poly(vinylidene Fluoride) and Poly(methyl Methacrylate)". Polymer samples were pressurize isothermally while the dielectric loss and storage was measured. The glass transition pressure was found to be a function of both temperature and pressurization rate. Results are compared (unfavorably) to current glass-transition theories, and (favorably) to viscoelastic theories. The results of this investigation are expected to reveal new insights in the field of polymer processing.

**INVITED TALKS & CHAIRMANSHIPS**

Rate Dependence of the Glass-Transition Pressure; The Annual March meeting of the American Physical Society, New York, 1987.

The State of Plastics Packaging Recycling Research; The October meeting of the Society of Packaging & Handling Engineers, Philadelphia, October 1988.

The Role of Stabilized Plastics in Recycling; The annual stabilized polymer symposium at Brooklyn Polytechnic, January 1989.

Lumber and Other Useful Products from Milk Bottles and Plastic Cups; The annual invited lecture of the Physics and Engineering Department of Washington

and Lee University, Lexington, Virginia, April 1989.

The Processing and Properties of Commingled Plastics and Polystyrene with other Plastic Wastes; Fall, 1989 Meeting of the American Institute of Chemical Engineers in San Francisco, California, November 1989.

An Alternative Marine Construction Material; The Port Authority of NY and NJ Marine Borer Research Committee Meeting, New York City, November 1989.

Chairman, Plastics Recycling Session of the Fifth International Conference on Solid Waste Management and Secondary Materials; Philadelphia, December 7, 1989.

Disposal Alternatives: Plastic Film Reprocessing, Recycling, Waste Disposal; Flexible Packaging Association Technical Conference, Atlanta Georgia, January 1990.

The Results of including Polystyrene with Post-Consumer Plastics in a Commingled Recycling System; Society of Plastics Engineers Recycling Fair, Burbank, California, April 1990.

Giving a Second Life to Trash: The Eastern Equipment Committee of the Institute of Packaging Professionals Spring Meeting, Saddle Brook, NJ, March 1990.

The Future for Recycled Plastics; The Design for the Earth Conference, Philadelphia College of Art & Design, April 1990.

Effect on Properties of Commingled Waste Plastics with the Introduction of Polystyrene Waste; 24th ACS Middle Atlantic Regional Meeting, Fairleigh Dickinson University, Morristown, New Jersey, May 1990.

Mechanical Properties of Commingled Plastics Manufactured from Post Consumer Waste; 1990 World Recycling Conference and Exhibition; Baltimore, MD, June 1990.

Commingled Technology and Commingled Economics; 1990 Plastics Fair; Atlanta, GA; November 1990.

Effects of Recycling on Materials, Standards and Performance, 1990 Pack Expo, Chicago, IL, November 1990.

Construction Materials in the Aquatic Environment: Toxicity to Marine Organisms; International Ocean Pollution Symposium; April 1991, Mayaquez, PR.

Adhesives Compatible with Resin Recovery Systems; Institute of Packaging Professionals Adhesives Committee Meeting; Piscataway, NJ, May 1991.

New Developments in Commingled Plastics Processing; 1991 World Recycling Conference and Exhibition; Chicago, IL, June 1991.

Research Results - Refined Commingled Processing; (Paper and Chairman) The Fourth Chemical Congress of North America; New York City; August 1991.

Commingled Post-Consumer Plastics Recycling: History and Major Developments; ARCO Chemical Company, 1992 Spring Symposium Program, West Chester, PA, June 1992

Structure and Properties of Recycled Commingled Plastics Processed with Polystyrene; The 4th Chemical Congress of the American Chemical Society, New York City, August 1991.

Properties of Refined Reinforced Post-Consumer Plastics; Society of Plastics Engineers Regional Technical Conference, Louisville, Kentucky, September 1991.

Dual Phase, Co-Continuous Morphology From Mixtures of Recycled Polystyrene/Curbside Tailings Materials; Society of Plastics Engineers 1992 ANTEC Conference, Detroit, Michigan.

Thermal Characteristics of the Dual Phase Region in Mixtures of Recycled Polystyrene/Curbside Tailings Materials; Society of Plastics Engineers 1993 ANTEC Conference, New Orleans, LA.

Introduction to Recycled Plastic Lumber and Piles; NYC Mayors Office on Construction - Interagency Waterfront Construction Meeting, June 18, 1993, New York, NY.

The Use of Commingled Plastic Lumber as Construction Materials, Society of Plastics Engineers 1993 ANTEC Conference, May, 1993, New Orleans, LA.

Refined Commingled Processing of Post-Consumer Plastic Blends from an All Rigid Plastic Container Collection System, Society of Plastics Engineers 1994 ANTEC Conference, May, 1994, San Francisco,CA.

Refined Commingled Processing of Post-Consumer Plastic Blends from an All Rigid Plastic Container Collection System, Society of Plastics Engineers 1994 ANTEC Conference, San Francisco,CA.

Innovative Structural Design Concepts for Plastic Lumber Materials, Society of Plastics Engineers 1996 ANTEC Conference, Indianapolis, IN, May, 1996.

**PUBLICATIONS**

Technology Transfer Manual - Plastic Beverage Bottle Reclamation Process; T. Nosker, et.al. Published by Rutgers University - Center for Plastics Recycling Research, September 1987.

The Recycling of Post-Consumer Plastics Packaging Wastes in the United States; T. Nosker, et.al. Presented at the Second China International Packaging Conference, September 1988. Published in Conference Proceedings.

Technology Transfer Manual - Plastics Collection and Sorting: Including Plastics in a Multi-Material Recycling Program for Non-Rural Single Family Homes; T. Nosker, et.al. Rutgers University Center for Plastics Recycling Research, November 1988.

Commingled Plastics Recycling and Environmental Concerns; T. Nosker et.al. Presented at U.S. EPA Municipal Solid Waste Technology Conference, San Diego, California, January 31, 1989. To be published in proceedings.

The Beneficial Environmental/Energy Impact of Post-Consumer Plastic Recycling in the United States; T. Nosker, et.al. Presented at U.S. EPA Municipal Solid Waste Technology Conference, San Diego, California, January 31, 1989. To be published in proceedings.

Physical Characteristics and Properties of Profile Extrusions Produced from Post-Consumer Commingled Plastic Wastes; T. Nosker, et.al. Presented at the Society of Plastics Engineers 1989 ANTEC meeting in New York City, May 1, 1989. Published in conference proceedings. This paper was also invited to be presented at The Society of Plastics Engineers and The Society of the Plastics Industry's co-sponsored Plastics Show and Conference East, Philadelphia, September 12, 1989. Published in Conference proceedings.

Properties and Processing of Commingled Plastics from the Post-Consumer Waste Stream; T. Nosker, et.al. RecyclingPlast IV Conference, Washington D.C., May, 1989. Published in Conference proceedings.

Improvements in the Properties of Commingled Plastics by the Selective Mixing of Plastic Waste; T. Nosker, et.al. Presented at Regional Technical Meeting of the Society of Plastics Engineers in Charlotte, North Carolina, October, 1989. Published in Conference Proceedings.

Reclamation Techniques for Post-Consumer Plastics Packaging Wastes; T. Nosker et.al. Pharm Tech Fall Conference 1989, Philadelphia, September, 1989. Published in Conference Proceedings.

The Economics of Plastic Recycling as Part of a Multi-Materials Curbside Recycling Program; T. Nosker, et.al. 5th International Conference on Solid

Waste Management and Secondary Materials, Philadelphia, December, 1989. Published in Conference Proceedings.

Recycle Polystyrene, Add Value to Commingled Plastics Products, T. Nosker, et.al. **Plastics Engineering**, 46, February 1990 pp. 33-36.

The Processing and Properties of Post-Consumer, Non-Beverage Bottlescrap, Utilizing Non-Intermeshing Twin Screw Extruder Technology; T. Nosker, et.al. Presented at Regional Technical Meeting of the Society of Plastics Engineers in Lehigh Valley, PA, October 1990. Published in conference proceedings.

Properties and Morphologies of Recycled Polystyrene/Curbside Tailings Materials; T. Nosker, et.al. Presented at Society of Plastics Engineers, 1991 ANTEC meeting May, 1991 in Montreal, Published in conference proceedings, pp.2150-2154.

Properties of Reinforced Compounded Post-Consumer Plastics; T. Nosker, et.al. Presented at Society of Plastics Engineers, 1991 ANTEC Meeting May, 1991 in Montreal. Published in conference proceedings, pp.2155-2161.

Positron Lifetimes in Blends of Recycled Polystyrene and Polyethylene; T. Nosker, et.al. **physica status solidi** (part a), 23, (2), February 16, 1991.

Stronger Recycled Plastics; T. Nosker, et.al. **Nature**, 350, (6312), April 18, 1991, p.563.

Properties of Refined Reinforced Post-Consumer Plastics; T. Nosker, et.al. Proceedings, Society of Plastics Engineers Regional Technical Conference, Louisville, Kentucky, September 1991.

Toxicity of Construction Materials in the Marine Environment: A Comparison of Chromated-Copper-Arsenate-Treated Wood and Recycled Plastic; T. Nosker, et.al. Arch. Environ. Contam. Toxicol. 22, (99-106), 1992.

Compatibilization for Reuse of Commingled Post-Consumer Plastics; T. Nosker, et.al. Presented at Compalloy '92, April 1992, Short Hills, NJ. Published in Conference Proceedings.

Dual Phase, Co-Continuous Morphology from Mixtures of Recycled Polystyrene/Curbside Tailings Materials, T. Nosker, et.al. Presented at Society of Plastics Engineers, 1992 ANTEC Meeting, May 1992, Detroit, MI. Published in Conference Proceedings p.2396-2400.

Compatibilization of Refined Commingled Post-Consumer Plastics, T. Nosker, et.al. Presented at Society of Plastics Engineers 1992, ANTEC Meeting, May 1992, Detroit, MI. Published in Conference Proceedings pp. 596-601.

Properties and Microstructure of Impact Modified Post-Consumer Plastics; T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1993 ANTEC Conference, May, 1993, New Orleans, LA.

Thermal Characteristics of the Dual Phase Region in Mixtures of Recycled Polystyrene/Curbside Tailings Materials; T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1993 ANTEC Conference, May, 1993, New Orleans, LA.

The Use of Commingled Plastic Lumber as Construction Materials; T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1993 ANTEC Conference, May, 1993, New Orleans, LA.

Compatibilization of Refined Commingled Post-Consumer Plastics; T. Nosker, et.al. **Advances in Polymer Technology**, 13, (231), 1994.

Refined Commingled Processing of Post-Consumer Plastic Blends from an All Rigid Plastic Container Collection System; T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1994 ANTEC Conference, May, 1994, San Francisco, CA.

Morphology of Blends of Post-Consumer PET With Curbside Tailing; T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1994 ANTEC

Conference, May, 1994, San Francisco, CA.

Improving Quality Control: Development of Standardized Test Methods Applicable to Recycled Plastic Lumber, T. Nosker, et.al. Proceedings, Society of Plastics Engineers Annual Recycling Conference, Chicago, IL, November, 1994.

Morphological and Rheological Characteristics of Commercially Produced Recycled Plastics Lumber, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1995 ANTEC Conference, May, 1995, Boston, MA.

o Design for Recycling, T. Nosker, et.al. Proceedings, Society of Plastics Engineers Second Annual Recycling Conference, Akron, OH, November, 1995.

Predictive Techniques- Commingled Plastic Properties, T. Nosker, et.al. Proceedings, Society of Plastics Engineers Second Annual Recycling Conference, Akron, OH, November, 1995.

Innovative Structural Design Concepts for Plastic Lumber Materials, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1996 ANTEC Conference, Indianapolis, IN, May, 1996.

Design Considerations for the use of Plastic Lumber in Structural Applications, T. Nosker, et.al. Proceedings, the Fourth Materials Engineering Conference, American Society of Civil Engineers, Washington, D.C., November 1996.

Creep Behavior of Commercially Produced Plastic Lumber, T. Nosker, et.al. Proceedings, Society of Plastics Engineers ANTEC Conference, Toronto, Canada, May, 1997.

FRP Composite Piling Systems for Waterfront Applications, T. Nosker, et.al. Proceedings, Tri-annual Ports (>98) meeting, American Society of Civil Engineers, Long Beach, CA, March, 1998.

Long-Term Creep of Commercially Produced Plastic Lumber, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1998 ANTEC Conference, Atlanta, Georgia, April, 1998.

Development of a Recycled Plastic/Composite Crosstie, T. Nosker, et.al. **American Railway Engineering Association Bulletin No. 760**, 98, May, 1997.

A Performance-Based Approach to the Development of a Recycled Plastic Composite Crosstie, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1998 ANTEC Conference, Atlanta, Georgia, April, 1998.

Design for Recyclability- A Recycling Industry Initiative, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1998 ANTEC Conference, Atlanta, Georgia, April, 1998.

The Development of Polyolefin Based Oriented Glass Fiber Building Materials, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1999 ANTEC Conference, NY, NY, May, 1999.

Stress Relaxation of Polyolefin-Based, Oriented Glass Fiber Materials, T. Nosker, et.al. Proceedings, Society of Plastics Engineers 1999 ANTEC Conference, NY, NY, May, 1999.

o The Evolution of Plastic Lumber into Structural Applications; Proceedings, SPI Composites Institute=s International Composites Expo =99, Cincinnati, OH, May 1999. R.W. Renfree, T.J. Nosker.

o Developing a Recycled Plastic/Composite Railroad Tie; **Plastics Engineering**, vol. LV, no. 4, April 1999. T.J. Nosker, R.W. Renfree, et.al.

o Fiber Orientation and the Creation of Structural Plastic Lumber; **Plastics Engineering**, vol. LV, no.6, June 1999. T.J. Nosker, R.W. Renfree, K.E. Van Ness.

o The History and Future of Recycled Plastic Lumber; APlastics in Building Construction@, Vol. XXIV, No.2, 2000, R.W. Renfree and T.J. Nosker.

o Recycled Plastic Lumber: From Park Benches to Bridges; Proceedings, R=2000 Conference, Toronto, Canada, June 6, 2000.

**BOOKS**

"Plastics Recycling - Products and Processes". Chapter 9 - Commingled Plastics. R.J. Ehrig, ed. Munich, Germany: Carl Hanser Verlag, 1992.

**PATENTS**

Method of Deriving Polystyrene and Polyolefin Plastics Composite from Recycled Plastics, US Patent # 5,298,214. March 29, 1994. D.R. Morrow, T.J. Nosker, K.E. Van Ness, R.W. Renfree.

Method of Recycling Post-Consumer Plastic Waste, US Patent # 5,951,940. September, 1999. T.J Nosker, R.W. Renfree, R.G. Saba, J.R. Fernandes, K.E. Van Ness.

Composite Building Materials from Recyclable Waste, US Patent # 5,789,477. August, 1998. T.J. Nosker, R.W. Renfree.

Composite Building Materials from Recyclable Waste, South African Patent # 97/7748. July, 1998. T.J. Nosker, R.W. Renfree.

o Composite Building Materials from Recyclable Waste, US Patent # 5,916,932. June 29, 1999. T.J. Nosker, R.W. Renfree.

**HONORS AND AWARDS**

- 1998 Federal Laboratory Consortium award recipient. Received for work with US Army Corps. Of Engineers and ASTM on the development of test methods and standards for recycled plastic lumber materials.
- 2000 Civil Engineering Research Foundation Pankow Award Finalist for successfully developing Composite Railroad ties.
- 2000 Rainforest Relief Rainforest Star Award for successfully developing Recycled Plastic Composite Railroad Ties.